CLAIMS

1. A method of electronically compensating for process direction position errors of a laser beam in an electrophotographic device comprising:

reading a plurality of laser beam position measurements;

constructing a laser beam scan path model from said laser beam position measurements that generally models a scan path of said laser;

converting said laser beam scan path model into a Pel profile that characterizes process direction position errors of Pels written by said laser; and

warping a bitmap image based upon said Pel profile prior to writing said bitmap image by said laser beam.

2. The method according to claim 1, wherein said laser beam scan path model is rotated so as to form a mirror image of said scan path of said laser beam.

3. The method according to claim 1, further comprising compensating said laser beam scan path model based upon registration data entered into said device.

4. The method according to claim 3, wherein said registration data comprises skew correction information and said laser beam scan path model is compensated for skew comprising:

locating the position of the first writable Pel along said laser beam scan path model; and

rotating said laser beam scan path model about said first writable Pel based upon said skew correction information.

5. The method according to claim 1, further comprising:

converting said laser beam scan path model into a Pel model that corresponds Pel locations to associated locations of said scan path model, wherein said Pel profile is constructed from said Pel model.

6. The method according to claim 1, wherein said warping of said bitmap image data is performed by a bow processor in a controller of said electrophotographic device, and said warping of said bitmap image data based upon said Pel profile comprises converting said Pel profile into a bow profile, which translates said Pel profile into a format suitable for processing by said bow processor.

7. The method according to claim 1, wherein said plurality of laser beam position measurements comprise measurements taken at a plurality of test points.

8. The method according to claim 7, wherein said plurality of test points are read from a memory device on a printhead of said device.

9. The method according to claim 7, wherein each test point comprises a scan direction measurement, a process direction measurement, and a measurement corresponding to an angle of a rotating polygonal mirror in a corresponding printhead.

10. The method according to claim 9, wherein said scan direction measurements and said process direction measurements are taken relative to a predetermined, local coordinate system.

11. The method according to claim 10, wherein said laser beam scan path model is constructed by converting for each test point, the corresponding measurement in said scan direction and the corresponding measurement in said process direction, to a coordinate system taken with respect to a known point on a printhead of said device.

12. A method of electronically compensating for process direction position errors of a laser beam in an electrophotographic device comprising:

constructing a Pel profile that characterizes process direction position errors of Pels

written by said laser; and

warping a bitmap image based upon said Pel profile prior to writing said bitmap image by said laser beam, wherein said Pel profile is constructed by:

constructing a model of a scan path of said laser beam;

dividing said model into a plurality of Pel locations; and

determining for each Pel location, a corresponding offset in a process direction which is transverse to a scan direction of said laser beam, based upon said model.

13. The method according to claim 12, wherein each Pel location is encoded using at least two bits that define whether that Pel location defines a jump up, a jump down, or no jump.

14. The method according to claim 13, wherein each jump comprises one Pel in said process direction.

15. The method according to claim 12, wherein said offset for each Pel location is determined comprising:

dividing said model into a plurality of sections, each section comprising a plurality of Pel locations including a start Pel location which is the first Pel location in a corresponding one of said sections, and a stop Pel location which is the last Pel location in said corresponding one of said sections, and for each section:

determining a number of Pel locations in said section;

determining a process direction offset for each of said start and stop Pel locations;

determining a number of Pel jumps between said process direction offsets of said start Pel location and said stop Pel location; and

distributing said number of Pel jumps across said Pel locations in said section.

16. The method according to claim 15, wherein the process direction offset of each Pel location is encoded into a bit profile that encodes each Pel location process direction offset as a function of the process direction offset of an adjacent Pel location.

17. The method according to claim 16, wherein each process direction offset is encoded to represent a select one of no change in process direction position from an adjacent Pel location, a jump up one Pel location in the process direction relative to said adjacent Pel, or a jump down one Pel location in the process direction relative to said adjacent Pel.

18. The method according to claim 15, wherein said number of Pel jumps are distributed generally evenly across said section.

19. A method of electronically compensating for process direction position errors of a laser beam in a color electrophotographic device comprising:

constructing a Pel profile that characterizes process direction position errors of Pels written by a corresponding laser for each of four color image planes; and

warping an image by:

deconstructing said image into four bitmaps, each bitmap corresponding to a select one of said four color image planes; and

warping each bitmap based upon a corresponding one of said Pel profiles prior to writing said bitmap by said corresponding laser beam, wherein each Pel profile is constructed by:

constructing a model of a scan path of said corresponding laser beam;

dividing said model into a plurality of Pel locations; and

determining for each Pel location, a corresponding offset in a process direction which is transverse to a scan direction of said laser beam, based upon said model.